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10/573,908	12/18/2006	Robert Drake	MSP638/PCT/071038.00364	2127
27305	7590	08/06/2010		
HOWARD & HOWARD ATTORNEYS PLLC			EXAMINER	
450 West Fourth Street			MURATA, AUSTIN	
Royal Oak, MI 48067				
		ART UNIT	PAPER NUMBER	
		1712		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/573,908

**Applicant(s)**

DRAKE ET AL.

**Examiner**

AUSTIN MURATA

**Art Unit**

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 11-16 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-16 and 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date 6/1/2010
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This action is FINAL.

#### ***Election/Restrictions***

Claims 19 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/1/2010.

#### ***Response to Arguments***

Regarding claim 1,

Applicant argues on page 10 under remarks that the examiner's reasoning does not accurately reflect the knowledge of one of ordinary skill in the art. Applicant argues that one of ordinary skill in the art would have known the difficulties of printing preformed siloxane polymers. The examiner asserts that this fact does not mean that one of ordinary skill in the art would not consider using polysiloxanes in the invention of BAO et al. This is especially true as the advantage of BAO comes from the surface energy modifiers and is not as concerned with the exact polymer being deposited. Therefore one of ordinary skill in the art would expect any polymer (including siloxane polymers) would show smoother edges after printing.

Applicant further argues on page 10 that the because BAO reference teaches using silane-containing materials for surface energy modification and omits silane-containing polymers from the listing of suitable polymer inks, silane-containing polymers must have been considered and deemed unsuitable. The examiner disagrees. The omission of silane-polymers does not mean it was expressly considered. Without an

express teaching of silane-based polymers being unsuitable it cannot be fairly concluded from the reference they are unsuitable.

Applicant further argues silicon containing materials have too low a surface tension to be used in BAO et al. However, the examiner notes that silicon-based material is used in both the protrusions (relatively high surface energy) and in the recesses (relatively low surface energy). Therefore as long as there are different surface energy materials in the recesses and protrusions, there will be an improvement in smoothness of the printing edges.

Applicant further argues it would not have been prima facie obvious to one of ordinary skill in the art to polymerize a monomer and print it. However the reference is relied upon to teach that is commonly known to use silicon-containing polymers in microcontact printing ( $\mu$ CP). The examiner maintains that a layer of silicon containing polymer (CLEM **column 16 line 42**) is known to be microprinted and would be prima facie obvious to substitute the polymers in the method of BAO for the benefit of improved smoothness at the edges.

The rejection is maintained.

Regarding claim 6,

Applicant argues the rejection does not teach each and every element of the claim. However due to the claim limitations being written in the alternative "and/or" each and every limitation is not required to meet the claim. The examiner cited one of the alternatives (an ionized/excited gas stream) which satisfies the claim.

***Information Disclosure Statement***

Examiner was unable to consider referenced "000000" in IDS dated 6/1/2010, as no such reference exists. It is assumed that this is a typographical error.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1-5, 7-8, 11-13, 15, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) in view of CLEM et al. (US 6,518,168)**

Regarding claim 1,

BAO et al. teaches in the abstract, "method of creating patterns on substrates" (method of applying a patterned thin-film onto a substrate). The reference further teaches corona treatment utilized on the substrate, paragraph [0080] (plasma treating the substrate). BAO et al. also teaches printing polymers, that may be thermoplastic, thermosetting, thermoplastic elastomer, and may be crosslinked, crosslinkable, or non-crosslinked, paragraph [0071] (a variety of polymers can be utilized). The reference also teaches the same "soft lithographic printing technique" described in paragraph [0045], lines 15-19, of the instantly disclosed specification by providing a transfer member with protrusions and recesses paragraph [0012], and using the protrusions to print a pattern onto the substrate see **figure 1**. The method of BAO et al. does not require removal of residual liquid from the substrate surface as the step is not included. Due to the polymer ink already being polymerized before deposition onto the substrate, a curing step is not required.

The reference teaches using a polymer ink but does not expressly teach using organopolysiloxane polymers, organopolysiloxane oligomers, siloxane resins and polysilanes.

However, CLEM et al. teaches using a similar micro-printing process for depositing, in monomer form, alkylsiloxane column 14 lines 44-45 and octadecyltrichlorosilane column 21 lines 43-44, self assembled monolayers onto a substrate.

At the time of the invention it would have been *prima facie* obvious to one of ordinary skill in the art to use the monomers of CLEM et al. and polymerize them before stamping ( $\mu$ CP ) the pattern onto the substrate because, "This polymer inking technique has several advantages over other high throughput patterning techniques such as  $\mu$ CP and NIL," paragraph [0049].

Regarding claim 2,

CLEM et al. teaches in column 9 lines 63-66, "heights of features formed on surfaces in accordance with the invention of the above dimensions can be achieved as well, including an embodiment with lines of height smaller than 0.08 micron" (patterned thin-film has a thickness in the region of from 1 to 100 nm.

Regarding claim 3,

BAO et al. teaches in paragraph [0080] corona treating the substrate (wherein step (i) is carried out utilizing a suitable source selected from the group of a corona discharge source).

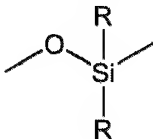
Regarding claim 4,

CLEM et al. expressly teaches using glass (glass) and polar polymeric surface (plastic) in column 14 line 59. BAO et al. teaches using metals, semiconductors, dielectrics and polymers, paragraph [0076]. Regarding claim 5,

BAO et al. teaches a pretreating step of a chemical primer layer or a corona treatment layer, paragraph [0080].

Regarding claim 7,

CLEM et al. teaches using an alkylsiloxane which is a monomer with a Si-O backbone with an alkyl (carbon chain) attached as an R group, see illustration. Polymerization of the monomer would inherently be linear or cyclic.



Regarding claim 8,

CLEM et al. teaches using alkylsiloxane but does not expressly teach the alkyl (hydrocarbon chain) group being between 1 and 40 carbon atoms. However, teaching an alkyl group but not teaching the exact carbon chain length teaches chain lengths between  $\text{CH}_3$  to  $\text{C}_{n\text{H}_{(2n+1)}}$  which overlaps with the range of between 1 and 40 carbon atoms. The overlap of ranges is considered a *prima facie* case of obviousness MPEP 2144.05 I. At the time of the invention one of ordinary skill in the art would have understood that an alkyl group could consist of a carbon chain between 1 and 40 carbon atoms.

Regarding claim 11,

BAO et al. teaches a very similar process as the printing process described in the instantly disclosed specification paragraph [0045] as it uses a stamp-like applicator to imprint patterns onto a substrate where the protrusions contact the substrate, see BAO et al. figure 1.

In addition, CLEM et al. teaches the same "soft lithographic printing technique" described in the instantly disclosed specification in paragraph [0045]. CLEM et al. figure 1a, "a surface 12 at least outward facing portions 16 thereof, coated with a self-assembled monolayer (SAM) forming species 17. When the applicator is applied to the substrate 18 and removed, a SAM is formed at regions 20 of the substrate contacted by outward facing surfaces 16."

Regarding claims 12 and 15

CLEM et al. teaches in column 20 lines 27-29, "a stamp including protrusions of parallel lines was first applied to the surface, removed and rotated 90°, and reapplied" (an additional coating is applied to form a second layer on the patterned film) (using a soft lithographic printing technique).

Regarding claim 13,

The combination of BAO et al. and CLEM et al. teaches the limitation of claim 1 but does not teach the process being continuous, however making a process continuous is not a patentable feature, see MPEP 2144.04 V(E).

Regarding claim 16,



CLEM et al. teaches using alkylsiloxanes, column 14 line 51, as the material being patterned on the substrate. Polymerized or not, the alkyl group is a saturated hydrocarbon chain (nonpolar) which will make the patterned left on the substrate hydrophobic.

Regarding claim 21,

CLEM et al. teaches in column 2 line 36-38, applying a blocking agent pattern and material is deposited in a pattern complementary to the blocking pattern. (a region of the substrate surface is masked to substantially prevent or inhibit further physical or chemical changes to the previously uncoated, partially coated or fully coated substrate surface during a process step).

**Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) and CLEM et al. (US 6,518,168) as applied to claim 1 in further view of SPENCE (US 6,083,355).**

Regarding claim 6,

BAO et al. teaches a pretreating step of a corona treatment layer, which involves oxygen molecules breaking into atomic form and bonding to the substrate, but does not expressly teach the process occurring at atmospheric pressure.

However, SPENCE teaches in column 1 lines 39-41, that corona treatment can be done at atmospheric pressure when plasma treating polymer films.

At the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to use an atmospheric form of corona treatment because it is an economical means for surface modification, column 1 lines 44-45.

**Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) and CLEM et al. (US 6,518,168) as applied to claim 1 in further view of NOMURA et al. (US 2003/0211342).**

Regarding claims 14 and 18,

The combination of BAO et al. and CLEM et al. teaches creating the patterned layer of claim 1, but does not expressly teach using the pattern to modify the alignment of liquid crystal.

However, NOMURA et al. teaches that it is known in the art to use siloxane and silane compounds in thin films to modify the properties of liquid crystal alignment, paragraph [0023].

At the time of the invention it would have been *prima facie* obvious to one of ordinary skill in the art to use the silane and siloxane elements as a patterned layer for modifying liquid crystal alignment because the modifications are resistant to degradation, NOMURA et al. paragraph [0023].

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AUSTIN MURATA whose telephone number is (571)270-5596. The examiner can normally be reached on Monday through Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL CLEVELAND can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AUSTIN MURATA/

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Examiner, Art Unit 1712

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1712